

Investigation • On the Road Again

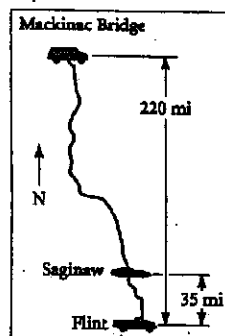
Name _____ Period _____ Date _____

You will need: the On the Road Again Table and On the Road Again Grid worksheets

A green minivan starts at the Mackinac Bridge and heads south for Flint on Highway 75. At the same time, a red sports car leaves Saginaw and a blue pickup truck leaves Flint. The car and the pickup are heading for the bridge. The minivan travels 72 mi/h. The pickup travels 66 mi/h. The sports car travels 48 mi/h.

When and where will they pass each other on the highway? In this investigation you will learn how to use recursive sequences to answer questions like these.

Step 1 Find each vehicle's average speed in miles per minute (mi/min).



Step 2 Write recursive routines to find each vehicle's distance from Flint at each minute. What are the real-world meanings of the starting value and the rule in each routine? Use calculator lists.

Step 3 Use the On the Road Again Table worksheet to record the highway distance from Flint for each vehicle. After you complete the first few rows of data, change your recursive routines to use 10 min intervals for up to 4 h.

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Step 4 Define variables and plot the information from the table onto the On the Road Again Grid worksheet. Using a different color for each vehicle, plot its (*time*, *distance*) coordinates.

Step 5 On the graph, do the points for each vehicle seem to fall on a line? Does it make sense to connect each vehicle's points in a line? If so, draw the line. If not, explain why not.

Use your graph and table to find the answers for Steps 6–10.

Step 6 Where does the starting value for each routine appear on the graph? How does the recursive rule for each routine affect the points plotted?

Step 7 Which line represents the minivan? How can you tell?

Step 8 Where are the vehicles when the minivan meets the first one headed north?

Step 9 How can you tell by looking at the graph whether the pickup or the sports car is traveling faster? When and where does the pickup pass the sports car?

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Step 10 Which vehicle arrives at its destination first? How many minutes pass before the second and third vehicles arrive at their destinations? How can you tell by looking at the graph?

Step 11 What assumptions about the vehicles are you making when you answer the questions in the previous steps?

Step 12 Consider how to model this situation more realistically. What if the vehicles are traveling at different speeds? What if one driver stops to get gas or a bite to eat? What if the vehicles' speeds are not constant? Discuss how these questions affect the recursive routines, tables of data, and their graphs.

On the Road Again Table

Name _____ Period _____ Date _____

Highway Distance from Flint

[illegible]